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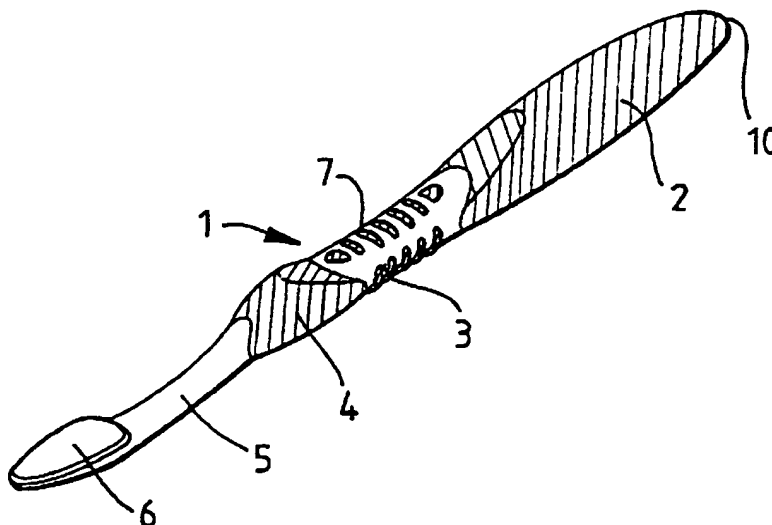
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(54) Title: **A HANDLE FOR A TOOTHBRUSH**



(57) Abstract: The handle of the present invention is for a personal care implement, especially for a toothbrush. The handle has distal and proximal ends, the distal end being connected to, or adapted to connect to, a grooming head. The handle comprises: a) a first grip portion (2), adjacent the proximal end of the handle, for holding in the user's hand, the first grip portion having an ovoid cross-section which has a major axis and a minor axis; b) a second grip portion (3), for manipulation by the user's fingers, extending from the first grip portion in the direction of the distal end of the handle, and having, at least in a region adjacent the first grip portion, an elliptical cross-section which has a major axis and a minor axis. The major axis of the second grip portion is perpendicular to the major axis of the first grip portion. The handle is comfortable to hold, provides a firm grip and facilitates manipulation, particularly rotation, by the user.

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## A HANDLE FOR A TOOTHBRUSH

### Field Of The Invention

The present invention relates to handles for personal care implements, more especially for toothbrushes.

### Background Of The Invention

In order to function effectively, toothbrushes and other such hand-held implements require to be gripped firmly. However they often require the grip to be frequently changed, such as by rotating the handle within the user's hand, in order, for example, to reach different parts of the mouth, to adjust to brushing of different tooth surfaces or to employ varying brushing orientations as recommended by dental professionals.

Surprisingly, most toothbrushes still have a rather conventional handle which is typically rectangular, circular, or rounded rectangular in cross-section, with the cross-section being more or less the same shape along the length of the handle. Improvements to the grip are generally confined to the inclusion of elastomeric inserts. Nevertheless, the patent literature documents several attempts to improve upon the basic design.

US 4,780,924 describes an ergonomically designed toothbrush with a shaped handle which is comfortable to grasp in numerous ways with either hand. Although the handle has a distinctive shape in side view, it is described as being substantially rectangular in cross-section throughout its length.

US 5,191,671 describes a toothbrush with a handle having a trapezoidal cross-section which both aids in orientation of the bristles in the mouth and provides strength.

WO 96/01577 describes a toothbrush with a radial anti-slip structure protruding from and circumscribing the bottom and lateral surfaces of the handle. A stated advantage of this arrangement is that it does not force gripping at any predisposed orientation but allows for holding the toothbrush in the user's most habitual manner.

WO 97/07706, in the name of Colgate-Palmolive Company, describes a toothbrush with a handle which has an end portion, a shoulder and a waist, the waist being narrower in plan view than the end portion or the shoulder. The handle preferably also comprises grip-enhancing mats. A stated objective of the handle configurations is the provision of a toothbrush which is easier for the user to manipulate. The Applicant also markets a corresponding brush in Europe under the 'Sensation' name, further described on the applicant's web site as the 'Wave' toothbrush and said to be very comfortable to hold and manoeuvre. Although the patent application discloses different ratios of end portion

and/or shoulder to the waist between plan and side views, there is no disclosure of non-circular sections having different orientations. The marketed brush has a substantially constant shaped cross-section along its length.

WO 99/23910, in the name of Gillette Canada Inc., illustrates a toothbrush corresponding to the Oral-B® Cross-Action™ toothbrush which has a grip portion of the handle having a rounded rectangular section and a narrower waist portion with an approximately square section .

Despite the foregoing, there remains a need for further improvement in the ergonomics of handle design for toothbrushes and the like. It has now been found that a handle which is comfortable to hold, provides a firm grip and facilitates manipulation, particularly rotation, by the user can be provided by arranging for adjacent first and second grip portions which have respectively ovoid and elliptical cross-sections having perpendicular major axes.

#### Summary Of The Invention

The present invention provides a handle for a personal care implement, especially for a toothbrush, the handle having distal and proximal ends, the distal end being connected to, or adapted to connect to, a grooming head. The handle comprises:

- a) a first grip portion, adjacent the proximal end of the handle, for holding in the user's hand, the first grip portion having an ovoid cross-section which has a major axis and a minor axis; and
- b) a second grip portion, for manipulation by the user's fingers, extending from the first grip portion in the direction of the distal end of the handle, and having, at least in a region adjacent the first grip portion, an elliptical cross-section which has a major axis and a minor axis;

characterised in that the major axis of the second grip portion is perpendicular to the major axis of the first grip portion.

An implement with a handle as described herein is comfortable to hold and easy to adjust within the hand. It is particularly suited for the manipulations required of a toothbrush but it is envisaged that it would also be suitable for similar personal care implements such as razors, hairbrushes, tongue scrapers and the like.

#### Detailed Description of the Invention

##### Definitions

The longitudinal axis of the handle is that which extends between the distal and proximal ends thereof. Other references to longitudinal should be taken to refer to directions along or parallel to the longitudinal axis unless specified otherwise.

Unless specified otherwise, handle cross-sections referenced herein should be taken perpendicular to the longitudinal axis of the handle.

Major axes refer to the longest dimensions of the cross-sections to which they refer. Minor axes refer to the longest dimensions of the same cross-sections drawn perpendicular to the major axes. A minor axis will always be shorter than the corresponding major axis.

By "ovoid" is meant a 2-dimensional figure approximately corresponding to the typical lengthwise cross-section of an egg, that is a generally rounded figure having one end which is more pointed than the other. It includes, for example, figures which may have partially flattened portions provided that the overall ovoid impression is retained.

#### Handle

The handle of the invention has distal and proximal ends. The distal end is connected to, or is adapted to connect to, a grooming head. That is, the grooming head is integrally formed with or can be detachably connected to the handle, for example to permit replacement of a worn head or to allow substitution of a different type of head, such as a gum massager, tongue scraper, tooth pick, compact brush or interdental brush for a regular brush head. The form of the head is not critical to the invention, although a correlation between the shape of the head and the first grip portion of the handle can provide additional benefits as discussed below.

In a preferred embodiment the handle has a head integrally moulded with it, the head bearing bristles or being subsequently fitted with bristles, such that it forms a toothbrush. The head, excluding bristles and massaging elements, can be of single construction or it can be multi-segmented as set out in WO-A-98/27846, incorporated herein by reference. Preferably it is of single construction. In a further particularly preferred embodiment the head comprises both bristles and massaging elements as disclosed in co-pending application 99GB-013717, incorporated herein by reference in its entirety. In the preferred embodiment the distal end of the handle has a primary grooming head integrally or releasably attached thereto, wherein the grooming head has bristles extending therefrom in a direction generally parallel to the major axis of the first grip portion and most preferably in the direction drawn towards the more pointed end of the ovoid cross-section.

The handle herein comprises at least first and second grip portions. The first grip portion, adjacent the proximal end of the handle, is for holding in the palm of the user's hand. It has an ovoid cross-section which has a major axis and a minor axis. The first grip portion has a longitudinal length of from about 50 to about 100 mm, preferably from about 60 to about 90 mm. In order to achieve a smooth transition into the second grip portion of the handle, the cross-section of the first grip portion may not be ovoid along its entire length but typically it will be ovoid along 50% or more, preferably 65% or more of its length. The ovoid cross-section has a major axis and a minor axis which are generally in the ratio of from 1.4:1 to 1.1:1, preferably in the ratio of from 1.3:1 to 1.1:1, and more preferably from 1.2:1 to 1.1:1. Again the precise values of the ratio may vary along the length of the first grip portion but this will generally be true along 50% or more, preferably 65% or more of its length. The first grip portion has a top surface which, in side profile, is preferably arcuate to provide a more comfortable grip. The proximal end of the first grip portion is also preferably rounded for the same reason. A bottom surface of the first grip portion, opposed to the top surface thereof, is preferably flattened along at least part of its length so that the handle can rest in a stable position when placed on a flat surface, for example in order to avoid bristle contact with the surface. The maximum value of the major axis of the first grip portion, at about 40% to 60% along its longitudinal axis, is preferably in the range from about 15 to about 20 mm, more preferably from about 16.5 to about 19 mm. The maximum value of the minor axis of the first grip portion, generally occurring at about the same longitudinal position as that of the major axis, is generally in the range from about 11.5 to about 17 mm, preferably in the range from about 13 to about 17 mm, more preferably from about 14 to about 16 mm.

In an especially preferred embodiment the first grip portion is entirely coated with elastomer, this makes it comfortable to hold and allows greater flexibility in providing a distinctive appearance. The elastomer coating comprises part of the first grip portion and should be included in any dimensional analysis thereof. In order to reduce the friction between the brush and machinery parts during manufacturing, a 'stripe' of plastic can optionally be allowed to protrude through the elastomer at parts where the handle contacts guide channels when the handle is conveyed from one manufacturing station to another. Generally the first grip portion will be an integral part of the handle. It is also envisaged however that at least an outer part of the first grip portion could be removable, preferably with a snap on/off or friction fit, in order to conceal a storage area for a removable head; auxiliary grooming heads which can optionally be permanently attached or releasably attached to the proximal end of the handle; auxiliary materials such as toothpaste, other cleaning materials or diagnostic elements; or merely a thinner skeleton

which more easily fits into a conventional toothbrush holder. Alternatively, or additionally a removable first grip portion, or outer part thereof, can be adapted to provide a cap which can fit over the head which is attached to the distal end of the handle. In this way the whole implement can be adapted to occupy a smaller space when not being used and/or the head can be kept clean, making it particularly suited for travel usage. Suitable auxiliary grooming heads herein include, but are not limited to a gum massager, tongue scraper, tooth pick, compact brush or interdental brush.

The second grip portion of the handle extends from the first grip portion in the direction of the distal end of the handle. It is particularly for manipulation by the user's fingers and has, at least in a region adjacent the first grip portion, an elliptical cross-section having major and minor axes. The second grip portion typically has a longitudinal length of from about 20 to about 45 mm, preferably from about 25 to about 35 mm. Suitably the cross-section of the second grip portion is elliptical along 70% or more, preferably 90% or more of its length. The elliptical cross-section has a major axis and a minor axis which are preferably in the ratio of from 1.3:1 to 1.1:1, preferably from 1.2:1 to 1.1:1. Again the precise values of the ratio may vary along the length of the second grip portion but this will generally be true along 70% or more, preferably 90% or more of its length. The maximum value of the major axis of the second grip portion is preferably in the range from about 8 to about 14 mm, more preferably from about 10 to about 12 mm. The maximum value of the minor axis of the second grip portion is preferably in the range from about 8 to about 10 mm.

The major axis of the second grip portion is perpendicular to the major axis of the first grip portion.

The minor axis of the second grip portion extends between top and bottom surfaces thereof. In preferred embodiments at least one of the top and bottom surfaces, preferably both, has gripping ridges thereon. These are preferably formed from an elastomer and can readily be incorporated using conventional moulding techniques. The ridges, which preferably extend in a transverse direction along the surface(s), do not generally project from the surface(s) by more than about 1 mm and may also extend around the sides of the second grip portion. In measuring or calculating dimensions or ratios of the second grip portion any ridges present should be excluded.

In preferred embodiments herein the handle further comprises a third grip portion distal the second grip portion, the third grip portion being both wider and deeper than the second grip portion. The third grip portion can act as a thumb stop and is preferably

coated with an elastomer. The third grip portion can comprise a means for releasably attaching a head and/or neck to the handle.

The handle may further comprise a neck region at its proximal end, the neck region being generally of smaller cross-section than the rest of the handle and usually devoid of grip elements.

The bulk of the handle (and head where appropriate) is generally made of relatively non-compressible materials, preferably with a modulus of elasticity of at least about 500 MPa, more preferably at least about 1000 MPa, which are conventional in the manufacture of toothbrushes, especially plastics materials. Suitable plastics materials include, for example, polyamides, polypropylenes, polyurethanes, poly(methylmethacrylates), and cellulose acetate propionates. Polypropylene is preferred. Suitable polypropylenes include 'Polypropylene Mosten 52945' (marketed by Schulman), having a modulus of elasticity (ISO 178) of 1500 MPa and Apryl 3400 MA1 from Elf Atochem.

The handle (and head where appropriate) is typically made by injection moulding. Bristles and massaging elements can be attached to the head by art-known methods such as stapling and anchorless manufacturing technologies.

Elastomeric portions of the handle herein are preferably made of a thermoplastic elastomer having a hardness from about 10 to about 90 Shore A, more preferably from about 50 to about 80 Shore A and most preferably about 70 Shore A. Suitable materials include those available under the tradenames Megol, Santoprene and Multibase. Silicone elastomers are also useful. Preferably the handle comprise a unitarily moulded skeleton onto which the elastomer areas are moulded in a separate injection moulding step. Preferably all the elastomer areas are interconnected to allow single injection moulding.

#### Brief Description Of The Drawings

While the specification concludes with claims particularly pointing out and distinctly claiming the subject invention, it is believed the same will be better understood from the following description taken in conjunction with the accompanying drawings in which:

Figure 1 is a perspective view of an embodiment of a handle of the present invention.

Figure 2 is a top view of Figure 1.

Figure 3 is a bottom view of Figure 1.

Figure 4 is a side view of Figure 1.

Figure 5 is a cross-section through the second grip portion at S-S.



Figure 6 is a cross-section through the first grip portion at F-F.

Figure 7 is a side view of a second embodiment of a handle of the present invention.

#### Detailed Description Of The Drawings

Referring now to the drawings in detail wherein like numerals indicate the same element throughout the views there is shown in Figures 1 to 6 a handle according to the invention generally indicated as 1. The handle comprises first, second and third grip portions indicated respectively as 2, 3 and 4. The handle further comprises a slim neck 5 and has a head 6 integrally attached to distal end of the handle 1. In the preferred embodiment the head 6 has bristles extending from the upper face of the head 6, these are not shown however. In this embodiment the head, neck and second grip portion are all part of an unitarily formed polypropylene skeleton which extends the entire length of the brush. First and third grip portions, 2 and 4, have an outer coating of elastomer. The second grip portion further comprises gripping ridges 7 which extend transversely across and project from the upper and lower surfaces. A channel 8 running longitudinally along the handle connects the various elastomeric areas so that they can be manufactured by single-point injection moulding.

The first grip portion 2 has an ovoid cross-section, as best seen in Figure 6. A flattened portion 9 on the lower surface of the first grip portion allows the handle to rest in a stable position on a flat surface with bristle-bearing face of head 6 uppermost. Viewed in side profile, as in Figure 4, the first grip portion has an arcuate upper surface along the longitudinal direction. The proximal end 10 of the handle is rounded. As described above, the first grip portion can be detachable from the main body of the handle.

The second grip portion 3 has an elliptical cross-section, as best seen in Figure 5. Its major and minor axes, 11 and 12, are perpendicular to the major and minor axes, 13 and 14, of the first grip portion.

This embodiment comprises a third grip portion 4 which can act as a rest for the user's thumb and has a flat landing area 15 for that purpose.

In Figure 7, a second embodiment of the handle is shown in which portions 16 of the polypropylene part of the brush handle protrude through the elastomer coating of the first and third grip portions both along the sides of the handle and at its proximal end. The exposed polypropylene portions assist in the smooth running of the handle along manufacturing production lines.

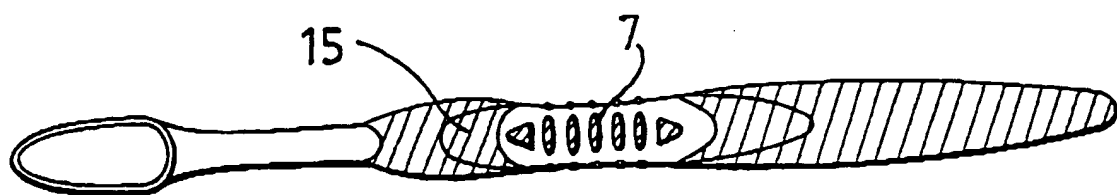
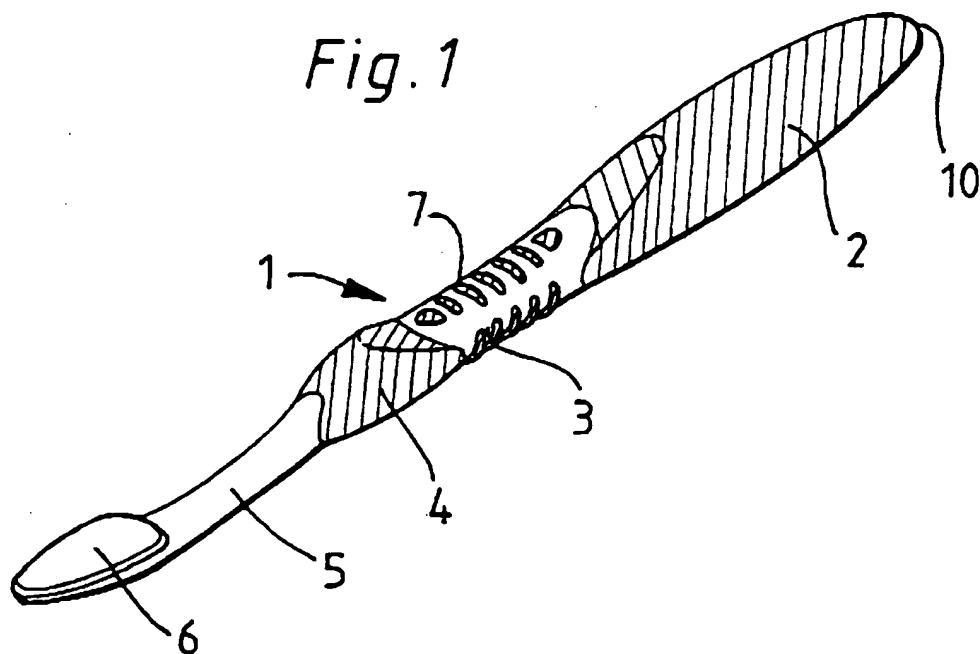
Claims

1. An elongated handle (1), for a personal care implement such as a toothbrush, having distal and proximal ends, the distal end being connected to, or adapted to connect to, a grooming head (6); the handle comprising:
  - a) a first grip portion (2), adjacent the proximal end of the handle, for holding in the user's hand, the first grip portion having an ovoid cross-section which has a major axis and a minor axis; and
  - b) a second grip portion (3), for manipulation by the user's fingers, extending from the first grip portion in the direction of the distal end of the handle, and having, at least in a region adjacent the first grip portion, an elliptical cross-section which has a major axis and a minor axis;  
characterised in that the major axis of the second grip portion is perpendicular to the major axis of the first grip portion.
2. A handle according to Claim 1 wherein the ratio of the maximum length of major axis of the first grip portion to the maximum length of the major axis of the second grip portion is from 1.2:1 to 1.8:1, preferably from 1.3:1 to 1.6:1.
3. A handle according to Claim 1 or Claim 2 wherein the ratio of the major axis of the first grip portion to the minor axis of the first grip portion is from 1.4:1 to 1.1:1.
4. A handle according to Claim 3 wherein the ratio of the major axis of the first grip portion to the minor axis of the first grip portion is from 1.3:1 to 1.1:1, preferably from 1.2:1 to 1.1:1.
5. A handle according to any preceding claim wherein the first grip portion has a longitudinal length of from 50 to 100 mm, preferably from 60 to 90 mm.
6. A handle according to any preceding claim wherein the first grip portion is coated with elastomer.
7. A handle according to any preceding claim wherein the ratio of the major axis of the second grip portion to the minor axis of the second grip portion is from 1.3:1 to 1.1:1, preferably from 1.2:1 to 1.1:1.
8. A handle according to any preceding claim wherein the major axis of the second grip portion has a maximum length of from 8 to 14 mm, preferably from 10 to 12 mm.

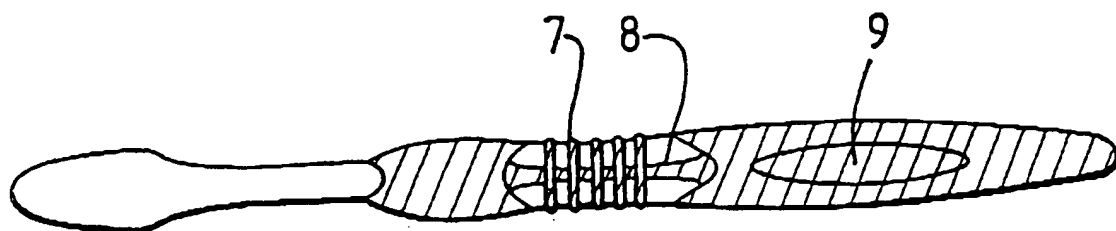
9. A handle according to any preceding claim wherein the minor axis of the second grip portion extends between top and bottom surfaces thereof and at least one of the top and bottom surfaces has gripping ridges (7) thereon.
10. A handle according to any preceding claim further comprising a third grip portion (4) distal the second grip portion (3), the third grip portion being both wider and deeper than the second grip portion.
11. A handle according to Claim 9 wherein the third grip portion is coated with elastomer.
12. A handle according to any preceding claim which has a primary grooming head (6) integrally or releasably attached to the distal end thereof, and wherein the grooming head has bristles extending therefrom in a direction generally parallel to the major axis of the first grip portion.
13. A personal grooming implement according to Claim 12 wherein the first grip portion is removable.
14. A personal grooming implement according to Claim 13 wherein the primary grooming head is releasably attached and the first grip portion conceals auxiliary grooming heads or a thinner skeleton.
15. A personal grooming implement according to Claim 13 or Claim 14 wherein the removable first grip portion is adapted to provide a cap which can fit over the primary grooming head.

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*Fig. 1*

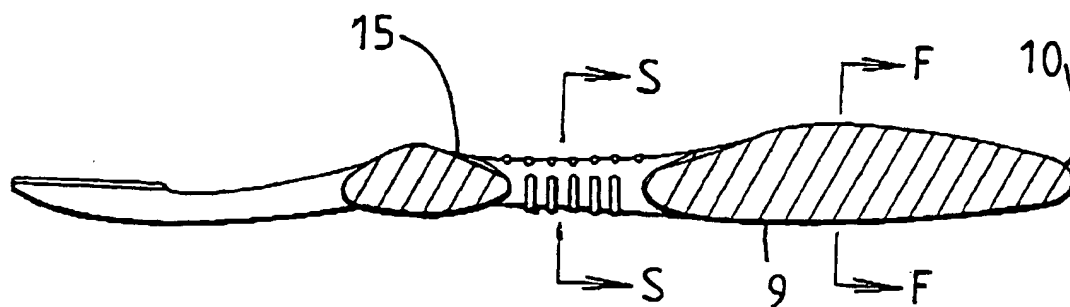


*Fig. 2*

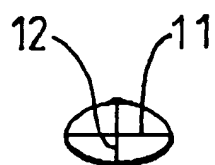


*Fig. 3*

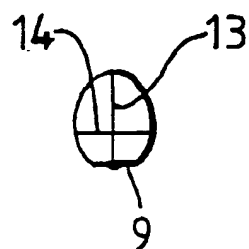
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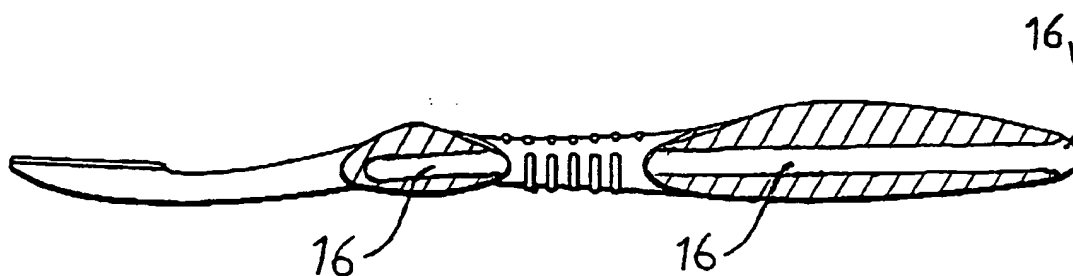
*Fig. 4*



*Fig. 5*



*Fig. 6*



*Fig. 7*

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/15534

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A46B5/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 99 23910 A (GILLETTE CANADA ;WONG PAREDES MAISIE (US); BEALS DONNA (US); ROBER) 20 May 1999 (1999-05-20) cited in the application page 3, line 14 - line 25; figure 1	1
A	WO 97 07706 A (COLGATE PALMOLIVE CO) 6 March 1997 (1997-03-06) cited in the application figures 4,5,13	1
A	US 5 398 369 A (HEINZELMAN BERT D ET AL) 21 March 1995 (1995-03-21) cited in the application figures 1-3	1
-/-		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

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Date of the actual completion of the international search

7 September 2000

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15/09/2000

Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

Inter national Application No

PCT/US 00/15534

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 850 735 A (HANSEN PAUL D ET AL) 25 July 1989 (1989-07-25) column 2, line 47 - line 56; figures 1A-F	1,13

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information on patent family members

International Application No

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